## II. *An Anſwer to Dr* Wright's *Letter, concerning the Cure of an Apoſthumation of the Lungs, by* William Cowper, *F. R. S.*

*S I R,*

HAd we more ſuch Communications as you are pleaſed to favour us with, the Publick as well as my ſelf would have reaſon to be thankful. *Obſervations* unqueſtionably are the beſt Charts in Medicinal Practice; but *they* muſt like *yours* be genuine, and not fram'd in favour of any Hypotheſis; when the Relator too often, not only conceals Truth, but is inclinable to add ſomething in favour of his Conjectures.

Nothing occurs to me ſo remarkable that you have omitted in relating Mr *Terry*'s caſe, as your Prognoſtick of her recovery, which indeed you ſeem induſtriouſly to avoid, when it muſt be your own obſervations in ſuch difficult caſes that made you Maſter of the conſequence, which I cannot forbear putting you in mind of, when you ſo often encouraged me to expect ſucceſs in her caſe, that was generally lookt upon as deplorable. You may remember, that the Matter or *Pus* which firſt flowed from her ſide was ſo offenſive in its ſcent, as obliged the By-ſtanders to quit the Chamber, inſomuch that the Nurſe uſually at the time of dreſſing and afterwards, was wont to burn Roſemary, *&c.* to ſuppreſs the Stench. So putrid was the *Pus* that it tarniſhed that end of the Silver Probe I paſt into the cavity of the Abſceſs, as it did the top of a Silver Syringe in making Injections. There ſeems no room to doubt that the *Pus* which then flowed from her ſide came from the ſame cavity

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ty the *Pus* did ſhe before Coughed up, when the Liquor that was Injected at her ſide came into her Mouth ; which ſhe frequently complained of, and particularly of the bitteriſh taſte of the Tincture of Myrrhe I ſometimes uſed in the Injections.

Among the many Diſaffections of the parts of Humane Bodies, the Diſeaſes of the Lungs have been lookt on as none of the leaſt dangerous : And indeed if Obſervations did not aſſure us of the poſſibility of ſucceſs, the commonly known ſtructure of the Lungs would afford us but mean Arguments for the ſhift Nature makes, in the Inſtance you have given ſo exact a Deſcription of, as well as ſome other Inſtances of the like Nature I have met with.

About two or three years ſince, I ſaw a Boy in the ninth or tenth year of his Age, who (ſome time before) after a Continu'd Fever was purſu'd with an Intermitting one ; a Cough follow'd, in which he brought up (at ſhort intervals) no ſmall quantity of thick purulent ſtinking *Pus*, which diſcharge (I think) continued on him not leſs than fourteen or fifteen months before I ſaw him : His Phyſicians order'd him Iſſues in his Back, which I made as uſual : He had then a healthy Aſpect, his Cheeks florid, and was very briſk and active : When he juſt came from play he was bid to take a Baſon in his Hand and Cough as he was wont, which he did, wherein I ſaw him diſcharge at his Mouth not leſs than 4 or 5 Ounces of the ſort of *Pus* above-mentioned : This his Mother told me he had been wont to do twice every day ; nor did he appear any ways diſordered after, but return'd to play immediately. His Phyſicians ſent him into the Country whence he came, where in about a twelvemonth I heard he dyed, but was not acquainted with his circumſtances after : What ſucceſs the operation we practiſed on Mrs *Terry* would have had on this Boy, I dare not determine ; tho I cannot but think it might have been ſafely done to him and another Patient I was ſince call'd to, but I could not obtain the conſent of the Phyſician that was conſulted.

Another inſtance (in which a conſiderable part of the Lungs was obſtructed, and conſequently became uſeleſs, ſome time before death) was in a Girl of ſixteen, who had been Scrophulous not leſs than 9 years; the Glands about her Neck and Throat being very much indurated as well as diſtended, her Lips and Noſe were alſo ſwoln: About a year and a half before her death ſhe Coughed up ſeven or eight ounces of fœtid *Pus*, in leſs than 24 hours. On changing the Air of this Town for that of the Country, together with the uſe of Balſamick Pectorals, ſhe recover'd a healthful appearance in her face; but continued ſomewhat Aſthmatick. On taking cold (as 'tis call'd) her Appetite as well as Digeſtion fail'd her, ſhe grew Feveriſh, and dyed after a few days indiſpoſition.

On opening the *Thorax*, I found the Lungs cleaving to the *Pleura* of the Left ſide, in ſuch manner that they could not be ſeparated, without one of thoſe parts borrowing from the other. A portion of one of the Left *Lobes* of the Lungs being cut off, ſunk in Water; from which part 'twas likely the Matter came which ſhe formerly Coughed up, tho the Ulcer was then cloſed, and no appearance of Matter was to be ſeen in that or any other part of the Lungs. The Lymphatick Glands at the divarecation of the Windpipe had by their Intumeſcens ſo compreſt the Canal of the Left ſide, that it wanted more than two thirds of its proper paſſage for the Air.

In theſe, and ſome other Inſtances I could produce, it's evident that conſiderable parts of the Lungs may be Obſtructed, and the perſon ſurvive: but Mr *Terry*'s Caſe demonſtrates the Poſſibility of their recovery when part of their Lungs are totally Obſtructed, as muſt happen in ſuch large Abſceſſes. But how the remaining ſound parts of ſuch diſeas'd Lungs become capable of tranſmitting the whole Maſs of Blood from the Right Ventricle of the Heart to the Left, in equal time and quantity with the Blood that Circulates in the reſt of the parts, ſeems not eaſily accounted for, when indeed it exacts our wonder that it is done in a Natural ſtate, when all the paſſages of the Lungs are open and free. Since I had often found Water, injected by the *Arteria Pulmonalis*, return readily from the Lungs again by the *Vena Pulmonalis*, I was tempted to try if melted Wax, when very hot, would not do the like, Which ſucceeded in two young Cats Lungs: for after Injecting the Wax (mixt with Oyl of Turpentine, and tinged with Vermillion) by the *Arteria Pulmonalis*, I found it had fill'd the Pulmonick Vein with the Left Auricle inſomuch that ſome of the Wax had reacht the Left Ventricle of the Heart: I don't remember this Experiment ſuceeeded, but that ſome of the Wax was extravaſated, and came into the *Broncheæ* and Wind-pipe at the ſame time.

In preparing a Human Heart, by filling its Ventricles, Auricles and Trunks of its large Blood Veſſels with Wax, I found on Injecting the Pulmonick Arteries and Veins with Wax differently tinged, that the Wax paſt from the Veins to the Arteries without coming into the *Broncheæ*, or being extravas'd, tho the Wax was not Injected with near ſo much force as might be. I muſt confeſs I was never ſo fortunate to make Wax paſs from the Arteries to the Veins in Human Bodies or Quadrupeds, unleſs in their Lungs, as above noted, and the *Spleen* and *Penis*; Nor do I remember it has happen'd in thoſe parts, but when the Wax has been impell'd with great force, tho I have conſtantly obſerv'd the Communication of Arteries and Veins of the *Spleen* and *Penis* more open than in other parts except the Lungs. I wiſh Dr * *Morland* had told us in what part of the Human Body Dr *Areſkin* had made Wax paſs from the Arteries to the Veins, ſo as to demonſtrate their Continuation to the Naked Eye, becauſe I have hitherto found the Naked Eye unable to diſcover the Extremities of the Arteries and Veins, when the Blood it ſelf was moving in them, in the tranſparent parts of the

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* Phil Tranſact. No 283. pag. 1292.

*Omentum* or *Meſentery* of Quadrupeds, or in the Lungs of Frogs or Lizards when living; or after death when the Blood has been retain'd in their Lungs in the following manner. On making Inciſion into the Bodies of theſe Creatures their Lungs will ſtart out, and be diſtended with Inſpired Air; on which, make what haſte you can to paſs a Ligature (*i. e.* a Waxt Thread) and tye it firmly toward the upper part of the Lobe, as near the Heart as you can: When the Lungs of Frogs and Lizards are dryed, thus diſtended, you may examine them with your * Microſcope, and they will appear as repreſented Fig. 1ſt, 3d, 4th, 5th and 6th. The firſt and ſecond Figures ſhew the difference in the magnitude of the extremities of the Veins and Arteries of the Lungs, and thoſe of the foot of a Frog view'd with the ſame Microſcope.

Hence it appears that the Communications between the Arteries and Veins of the Lungs are more open than thoſe of other parts, at leaſt in the Feet of Frogs: And till it can be ſhewn that Melted Wax can be as eaſily injected from the Arteries to the Veins of other parts in a Humane Body and Quadrupeds, I ſhall be inclin'd to think the Communications between the Pulmonick Arteries and Veins in general are more open than the Arteries and Veins of other parts, except the *Spleen* and *Penis*.

This patent Communication of the Arteries with the Veins of the Lungs ſhews how thoſe Veſſels tranſmit the Blood in equal time and quantity with the Blood that moves

in

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* The Microſcope uſed in drawing the Figures is deſcribed and Figured Tranſact. No 281. The manner of applying the dry'd Lungs here mentioned, is thus, Take out the Glaſſes in the Slider or flat piece of Ivory, marked in the Fig. of that Tranſaction, e. e. f. f. and, paſt in the holes f. f. parts of the dry'd Lungs as mention'd, whether of Frogs, Toads, Snakes, Vipers, or the like Creatures, that have their Lungs Veſicated as well as Veſiculated; and by this means you may keep objects of the Lungs of thoſe Animals always by you; ſome of which I have had this three months, and are now as Beautiful as when firſt put in; only you are to remember to place the external ſmooth ſurface of the Lungs toward your Object Glaſs when you view it: In the ſame manner, the extremities of the Blood Veſſels of any Tranſparent parts of Animal Bodies may be examin'd by that Microſcope.

in the reſt of the Blood Veſſels of the whole Body in a healthful ſtate.

Hence it is, when any of the Blood Veſſels of the Lungs are ſtreightened or totally compreſt (either or both, which Circumſtances muſt happen in Mrs *Terry's* Caſe) the remaining unobſtructed Blood Veſſels are forced to diſcharge more than they were wont, and in time thoſe Veſſels become ſufficiently dilated to ſupply the defect. The like happens in the Communicant branches of the Arteries of any part, when ſome conſiderable Branch or Trunk is ty'd up, as in the operation for curing of an * Aneuriſm.

Thus, Sir, we find the ſtructure of the parts of Animal Bodies not only ſufficient to perform the ordinary operations of Nature, but their *Organs* are ſo wonderfully made, that notwithſtanding conſiderable parts of thoſe Organs are obſtructed, yet their neighbouring parts (as in the caſe before us, the Blood Veſſels) become capable of ſupplying the defect. This indeed exacts our gratitude as well as admiration of the Divine Architect.

* Vide Phil. Tranſact. No. 280. P. 1191. The Patient then mentioned is in perfect health and has recovered the intire uſe of his Arm.

# The Explication of the Figures.

## *Fig.* 1.

THat part of the 5th Figure at D . . . . . done by a larger Magnifying Glaſs, *i. e.* by the 3d Glaſs of the Microſcope deſcribed No 281. of theſe Tranſactions.

A The Arteries.

B The Veins of a Frogs Lungs prepared as above-mentioned.

C Their Inoſculations with each other.

D . . . . . The *Area* of the Microſcope, as it appears to the naked Eye.

## *Fig* 2.

Part of the hinder foot of the young Frog viewed with the ſame Microſcope when living; whereby the different magnitude of the extremities of the Arteries and Veins of the Lungs in the firſt figure, and in this expreſt at C C is very evident; The former being capable of admitting at leaſt three Globules of Blood to paſs abreaſt, whereas the extremities of the Arteries and Veins in the Feet admit of one Globule of the Blood only to paſs before the other.

A A The Trunks of the Arteries.

B B Thoſe of the Veins lying by the ſide of the Toes.

C C Their Extremities continu'd with each other, in the tranſparent Membrane between the Frogs Toes.

a a Two of the Frog's Toes.

## *Fig* 3. and 4.

The extremities of the Arteries and Veins of a Frog's Lungs, viewed with the 4th Glaſs of the ſame Microſcope, made by *James Wilſon.*

A A The Arteries.

B B The Veins.

C C Their conjunctions with each other.

D The *Area* of the Microſcope.

## *Fig* 5.

One of the *Hexagon Areæ* of a Frog's Lungs, which were not ſo much diſtended by Inflation, as thoſe parts of the Lungs repreſented in the two former Figures 3 and 4, whereby the little *Areæ* or Cells in the Interſtices of the extremities of the Veins and Arteries appear cloſer and leſs than in the two foregoing Figures, tho viewed by the ſame Microſcope.

A The Arteries.
B The Veins.
D The *Area*, which is more magnified at Fig the 1ſt.

## Fig 6.

The lower part of one of the Lobes of a Water Lizard's Lungs, as it appears by the Microſcope, when the Blood is retained in the extremities of the Veſſels, as in the preceeding Figures.

A A The Trunk of the Pulmonick Artery.
B B The Vein.
C C . . . Their Branches, joyning with each other.
D D The tranſparent ſmooth Membrane, which in this Creature, is not viſiculated, or full of Cells, as in the Lungs of Frogs, on which the Blood Veſſels are expanded ; nor does the Internal ſurface of this Membrane differ from the External, as in Frogs and divers amphibious Creatures. The Lungs of theſe Water Lizards being veſicated, and not veſiculated.

If, Sir, in this, the Publick or your ſelf meet with any ſatisfaction, I ſhall think the time well beſtowed, by

*Your obliged*

*Humble Servant,*

Wm Cowper.

Fig: 1.

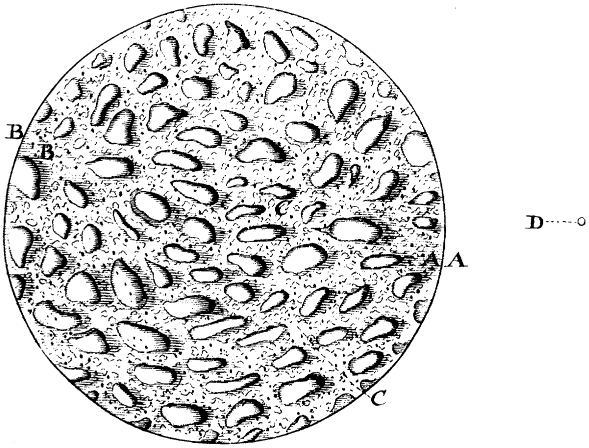

Fig: 2.

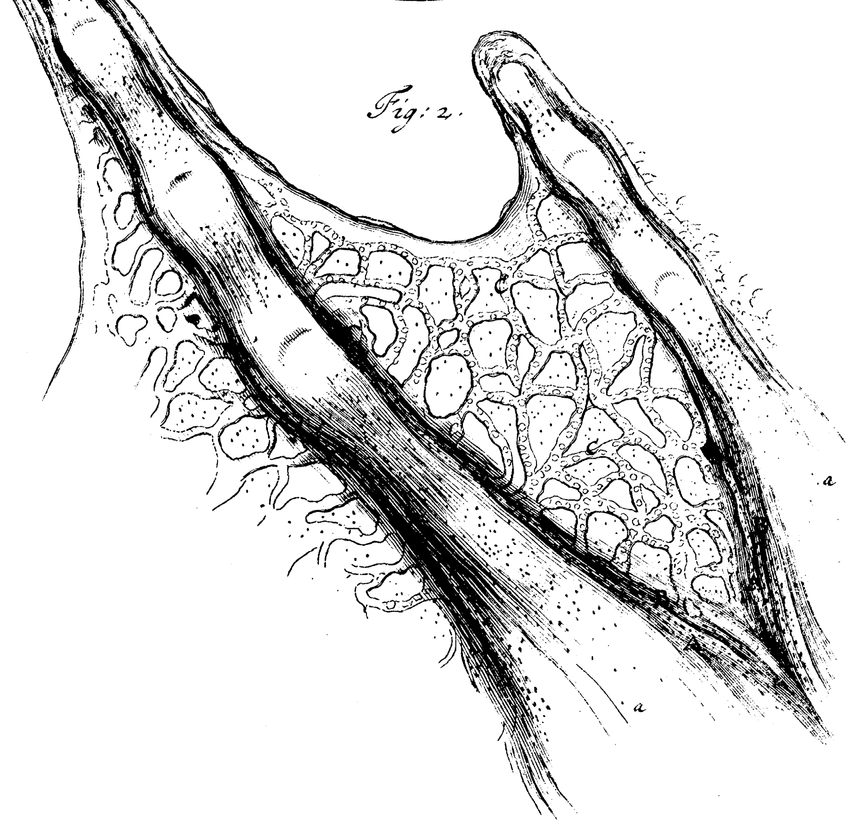

Fig: 3.

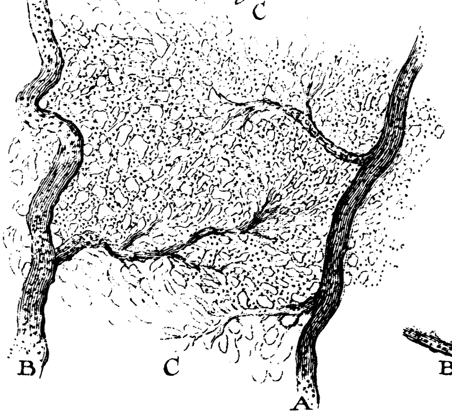

Fig: 4.

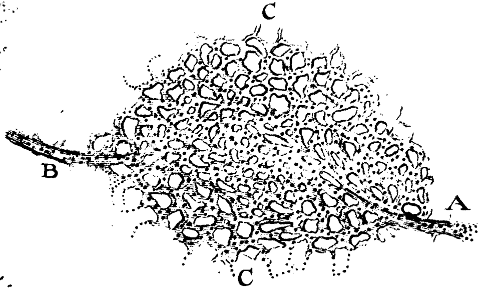

Fig: 5.

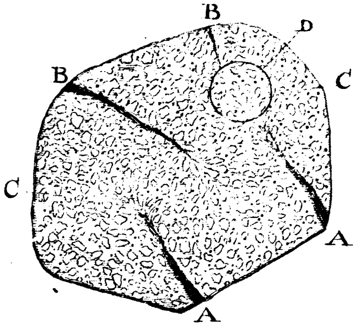

Fig: 6.